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BOTANICAL SURVEY OF INDIA : 1958-1983

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The Botanical Survey of India (BSI) was first established in 1890, but after actively functioning for about a decade and with a low profile for about three decades, it was almost wound up with the retirement of its last Director Dr. C. C. Calder in 1939.

After independence, in early 1950s, it was realized by the planners and senior botanists in the country that a proper assessment of natural plant resources of the country was urgently needed. Dr. E. K. Janaki Ammal, was appointed Officer-on-Special Duty, to prepare a 'PLAN' for the reorganisation of the BSI. The reorganized BSI can be said to have started around 1955 with the appointment of Dr. H. Santapau (ad-hoc) and later of Dr. J. C. Sen Gupta, as a regular Chief Botanist of the Botanical Survey.

Hence, the narration of the activities of the BSI from 1958 to 1983, will include practically the account of total development and activities of the reorganised Department. An account of the establishment, development and activities of the BSI since its reorganisation has been recently published.** The significant developments during these 25 years can be summarized as below :

Initial reorganisation :

The Survey was started with a small headquarters organisation, Industrial Section of the Indian Museum, Central Botanical Laboratory, and four Regional Circles at Coimbatore, Shillong, Pune and Dehra Dun. The establishment of the fifth Regional Circle at Allahabad soon followed. The Herbarium of the Indian Botanic Garden (IBG) was transferred to the BSI in 1957, to be developed into the Central National Herbarium for the country. The IBG along with its Library was transferred to the BSI in January 1963. Two more Circles, viz. the Arid Zone Circle and the Andaman & Nicobar Circle were established in 1972 at Jodhpur and Port Blair respectively. A station for the botanically rich region of Arunachal Pradesh was established at Itanagar in 1977 and for Sikkim Himalayas at Gangtok in 1979.

Strengthening of research an otdher infrastructure at Headquarters :

In order to co-ordinate the activities of the various Regional and other Offices under the BSI, adequate scientific and administrative infrastructure was necessary at the headquarters (Hqrs.). Further, in addition to conventional herbarium taxonomy, adequate support from laboratory and field research was also considered necessary. Several special technical units were established at the Hqrs. The Ecology Unit started studies on coastal regions and mangroves and later, considering the national needs and relevance, reoriented its work to studies on national parks, proposed biosphere reserves, tiger reserve areas, etc.

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** Basak, R. K. 1982. *Botanical Survey of India — An account of its Establishment, Development and Activities*, p. 1-300, Howrah.

Units have been developed also, for studies in cytology, palynology, plant physiology, cryptogamic botany, economic botany, phytochemistry, pharmacognosy and documentation. Most of these units are intended to provide biosystematic and experimental support to taxonomic studies. The Cryptogamic Unit is undertaking researches particularly on pteridophytes, bryophytes and lichens. These studies were initially confined only to Hqrs., but are now being undertaken also in some regional stations. The Unit has undertaken special explorations in Silent Valley areas and the unexplored regions of northeastern India. The Economic Botany Unit undertakes studies particularly on uses of plants by the tribal people. Special studies have been undertaken by the Pharmacognosy Unit on bark drugs and exhaustive work has been done on the genus *Coptis* in India. The phytochemistry unit was responsible for studies of *Solanum* species for Solasodine yielding plants and is undertaking phytochemical screening of different plant groups. The palynology and cytology units are supporting the Flora of India programme by data on pollen grains and chromosome numbers of different families and genera.

It was realised that the Central National Herbarium (CNH) has to play a very important role in the preparation of the new Flora of India and hence arrangements were made for sorting out the Type specimens (over Ten thousand), and Wallichian materials (over 12,000 specimens); and photographs of the type and other authentic specimens in Royal Botanic Garden, British Museum and the Linnean Herbarium (*ca* 12,000), in London, were procured. Further, the microfisches of the Linnean and 26 other important European Herbaria were procured for critical taxonomic work.

Due emphasis was given on the development of libraries at Howrah and Calcutta and the Regional Offices. The holdings in the libraries of the BSI at Howrah are the best in the country for floristics and taxonomy.

As soon as the essential minimum staff joined in the Hqrs. and the regional stations in the late fifties, extensive botanical explorations were started in different parts of the country. The newly opened regional stations started botanising in the unexplored and underexplored regions to enrich the existing herbaria and establish new herbaria in different parts of the country. Most of the regional stations now have herbaria and libraries adequate for their routine identification work, and small musea for purposes of education and research. The Herbaria of the BSI hold between themselves over two millions specimens of plants.

All the older regional offices are well-equipped for research in floristics and taxonomy and about 50 doctoral theses have been prepared in the BSI. The Regional stations have collected adequate materials (*ca* 300,000 field numbers) and information for advising the District or State Governments of those regions regarding utilisation and conservation of plant resources.

The regional officers are members of several important State level Environmental and Wildlife Committees and Task Forces. Many scientists of Hqrs. and regional offices are research guides and Honorary lecturers of Universities.

The preparation and organisation of regional and district floras in addition to the revisionary studies, is the main work of the regional circle offices. Three circles, viz. the Western, Southern and the Northern have already completed State Flora Analysis of some States under their jurisdiction.

Botanical and experimental gardens :

The Survey is maintaining and developing the famous Indian Botanic Garden (IBG) at Sibpur, Howrah in W. Bengal. It is not only successfully maintaining most of the earlier valuable collections, including the Great Banyan Tree, which is continuously expanding in its dimensions, it (IBG) has also introduced several new features like Medicinal Plants Garden, Orchidarium and special germplasm collections.

Considering the size of the country and the great variations in climatic conditions, there are very few botanical gardens in our country. An effort was therefore made to establish experimental gardens in different parts of the country under the auspices of the BSI and link them with some of the regional stations. Small gardens have been established at Allahabad, Shillong and near Pune, Yercaud (Coimbatore), Pauri (Dehra Dun), Barapani (Shillong) and Port Blair. The activities in these gardens include introduction of interesting plants of those regions, particularly rare and economic plants. Temporary conservatories or glass houses have been made in some of them. National Orchidaria have been established at the IBG (Howrah), Shillong and at Yercaud. Experimental beds of medicinal, rare and other interesting plants are being maintained in some of these gardens for conservation of germplasm and for supply of research material. A Green Book containing the list of rare or threatened plants growing in Botanic Gardens of the BSI has been published.

Publications :

Within a few years of the establishment of the department in 1955, it was realized that papers on floristics and taxonomy being usually large in size, did not find proper outlet for their publication in Indian or foreign journals. The Department, therefore, felt the necessity of starting a journal primarily for taxonomy, and a journal called the Bulletin of the Botanical Survey of India was started in 1959.

The Bulletin has completed its *25th year* in 1983, and excepting a few years, has been regular in its publication. The journal has, over these years, become one of the leading journals on floristics and taxonomy of tropical regions in the world. The bulk of the articles in the journal are on floristics, taxonomy and economic botany; but sometimes articles on allied subjects like anatomy, phytochemistry, ecology, palynology, pharmacognosy, cytology and other aspects of biosystematics are also included. A subject-wise analysis of the articles published in 25 volumes of the Bulletin is given in later pages. The scientists of the Survey have published about 3,000 articles in Indian and foreign journals.

Flora of India :

After the Deptt. had functioned for about 15 years, i.e. around early 1970s, it was felt that fairly exhaustive explorations have been done in some regions of the country, and that adequate old and new materials existed. It was decided that effort should be made to start publication of the new Flora of India. Several thoughts, suggestions, discussions and drafts of the formats and guidelines preceded the finalisation of the scheme by 1977, and the first Fascicle of the new Flora of India was published in 1978. A Style Mannual for the guidance of all authors of Flora of India was published and till to-date, 15 Fascicles of the new Flora of India have been published.

It was realised that in addition to the Fascicles which would deal with different plant groups on the national basis, the local needs and the great regional variations in flora of India fully justify advance preparation of floristic accounts on State, Regional and District Level.

The State Flora Analysis for Karnataka and parts of the Flora of Himachal Pradesh and Tamil Nadu have also been published. The District Floras of Jowai (Meghalaya), Tonk and Banswara (Rajasthan), Pachmarhi (M.P.) and Chamoli (U.P.) have been published.

The Floras of some more areas are under preparation. Some special publications on Cryptogams, Bibliographies, etc. have also been brought out; they are listed in Appendix of this paper.

The preparation of Flora of India, though primarily the work of the BSI, is actually a national programme. Assignments for the preparation of the Flora have been made to taxonomists outside the Survey, and as far as possible, the main criterian has been the expertise in the group.

Revisionary accounts for the Flora of India are being prepared by scientists in the National Botanical Research Institute, Forest Research Institute, Universities of Calcutta, Rajasthan, Kashmir, etc.

In order to intensify the work, a scheme of Emeritus Scientists is functioning in the Deptt. and some plant taxonomists having long experience in revisionary studies are working in the scheme. The Emeritus Scientist Scheme is applicable to taxonomists up to the age of 65; after that, there is a scheme of contractual work. The BSI also has a provision of 50 Junior and Senior Research Fellowships for work on Flora of India.

Further, in order to intensify studies on the District Floras, it was considered useful to involve teachers of taxonomy in universities and colleges and some research institutions, and about 70 districts in the country will be studied by non-BSI taxonomists. Work has already been started under this scheme on more than 50 districts. The scheme is expected to serve two useful purposes. It will train a large number of fresh M.Sc.s in collection and identification of plants, and preparation of floras, and thus provide a broad base of taxonomists in the country. It will also result in establishment of herbaria in educational institutions in different parts of the country, which in turn will help in teaching of taxonomy.

It was felt that the study of natural resources at micro-level will require involvement of still more educational institutions and a proposal to support small herbaria, or establish new herbaria received good response from the University Grants Commission, who have since sanctioned support to some old but impoverished herbaria and establishment of new herbaria, particularly in some remote places.

Studies on environment and conservation:

The Survey is also intimately involved in the assessment of environmental impacts of several developmental projects, study of vegetal cover and inventorisation of plant resources in important ecosystems.

Protection of areas from adverse biotic influences requires appreciation by local communities, support of the State and Central Governments, as also adequate legislations. Legislation already exists for protection of certain areas as National Parks, and some of the areas considered to have potential as Biosphere Reserves, have, as an initial step, been declared as National Parks, e.g. the Nanda Devi National Park in Uttar Pradesh and Kunchenzungha National Park in Sikkim. The BSI and certain other organisations have already initiated studies on the biological diversity and richness in such areas.

Mention could be made of some recent work on such protected areas, e.g. on Manas Wild Life Sanctuary, Corbett National Park, Madumalai in Tamil Nadu, Nanda Devi National Park, Dudhwa National Park, Silent Valley, etc. Ecological studies on flora of various River Valley Projects and environmental impacts were carried on Idduki area and Silent Valley in Kerala, Tehri Dam in Uttar Pradesh, Namdapha in Arunachal Pradesh, Lalpur Dam in Gujarat, etc. An account of the botany of certain Tiger Project areas* was published recently by the Survey. Some such areas under study are: Palamau Tiger Reserve, Radhanagari

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* Jain, S. K. & A. R. K. Sastry 1983. *Botany of some Tiger Habitats in India* pp. 1-71, Howrah.

Bison Sanctuary, Amaravati Tiger Project, Taroba National Park, etc. The ecosystems of some proposed sites for Biosphere Reserves, mangroves and Game sanctuaries are under study.

Conservation activities :

Over the last 50 years or more, a deterioration is being noticed in the constituents of the general vegetation of the country. Because of food, fodder, fuel and other economic reasons and of the opening up of the interior and hitherto inaccessible regions of forests, both in the plains and in the hills, many trees and other interesting plant species are facing destruction or extinction. The 'Project on Study, Survey and Conservation of Endangered Species of Flora' (POSSCEF), started in the Survey in February, 1980. Various remote and inaccessible parts of India were explored in order to assign the species into the appropriate IUCN categories and also to find suitable conservation measures. The lists of threatened species prepared on regional basis for States could be taken as base line data for the work on the endangered species of the country.

A list of 100 priority species has been prepared for the purpose of multiplication. The account of rare orchids of north-eastern India with illustrations and distributional maps is a noteworthy contribution.

Special field work has been done on certain species of *Coptis* Salisb., *Paphiopedilum* Pfitz., *Carex* L., *Calanthe* R. Br., *Hedychium* Koen., *Isachne* R. Br., *Swertia* L., *Sedum* L., *Gentiana* L., etc. A preliminary catalogue of about 800 threatened plants of India has been prepared.

In order to create country-wide awareness, publicity literature, essay competitions, nature study camps, and sit-and-draw competitions were organized. The Plant Conservation Bulletin and the Conservation Supplement of the *Bull. bot. Surv. India* are also being issued regularly.

The Survey is rendering valuable service in the identification of plants and supply of information on distribution, economic uses and correct names of plants.

Conservation education :

In addition to the routine museum display and other educational activities from the Industrial Section and other offices of the BSI, the Department organized several training programmes and Workshops at Coimbatore, Howrah, Dehra Dun, Shillong, Port Blair and Delhi. The first ever scientific gathering on the subject of threatened plants in the country, was organized at Dehra Dun in September 1981. The Proceedings of that Seminar have since been published and contain articles by about 50 scientists from different parts of the country, and covering various plant groups.* A Workshop on Conservation of Tropical Plant Resources in Southeast Asia was organised in Delhi in March 1982. In addition to scientists from India, it was attended also by the scientists from Australia, Indonesia, Italy, Malaysia, Nepal, New Zealand, Singapore, Sri Lanka, U.K., U.S.A., etc. The Proceedings of this Workshop have also been published.**

The Department is closely involved with several national and international conservation programmes like the Convention on International Trade in Endangered Species of Flora and Fauna, Species Survival Commission, International Union for Conservation of Nature and Natural Resources, etc.

In addition to its usual activities of collection, identification and preservation of plant specimens in Herbaria and Musea, and in living condition in experimental gardens or orchidaria, and technical advice to research workers, industries, and others, the BSI also provides support to many national and State level Government organisations and committees like the Indian Board for Wildlife, Man and Biosphere Committees, Committees for Eco-development, Forest Survey of India, Department of Ocean Development, CSIR, U.G.C., ICAR, ICMR, ISI, State Govt. Environmental Committees, State Boards for Wildlife and State Development Boards, etc.

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* Jain, S. K. *et al.* (Ed.) 1983. *An Assessment of Threatened Plants of India*, pp. 1-334, Howrah.

** Jain, S. K. & K. L. Mehra (Ed.) 1983. *Conservation of Tropical Plant Resources*, pp. 1-253, Howrah.

Inputs :

During the last 25 years, the staff strength has grown from less than one hundred in the first Five Year Plan to over 1500 (One thousand five hundred) during the Sixth Five Year Plan (FYP). (Fig. 1). The financial inputs into the Department increased from *ca* 71 lakh rupees in the first FYP to over 13 Crores during the Sixth FYP (Fig. 2).

Building Activity :

Out of the 14 units of the BSI, 6 (namely Hqrs., Laboratory, Herbarium and IBG at Howrah, and Coimbatore and Port Blair Offices) are housed in own new buildings; 4 (namely ISIM at Calcutta, and Shillong, Allahabad and Pune Offices) in own but old buildings, and 4 (namely Dehra Dun, Jodhpur, Itanagar and Gangtok Offices) still in rented buildings. New Buildings for Dehra Dun and Pune Offices have been sanctioned.

Funded Projects :

In addition to the Non-Plan and Plan allocations to the Deptt., it has been possible to undertake research in some thrust areas through projects funded by Research Councils, such as the projects on Idukki area, Great Nicobar, Dudhwa National Park, tribal areas of Bastar in Madhya Pradesh, Namdapha in Arunachal and Ethnobiology of some States, from MAB Committee, a programme on orchids from North Eastern Council, Shillong, some Fellowships of CSIR, and a Project on Threatened plants from the U.S. Fish & Wildlife Service.

These Projects, in all, brought funds to the tune of about one crore of rupees.

Future Programmes :

The Department has acquired adequate expertise in field botany, economic botany, herbarium taxonomy, several groups of cryptogams, some aspects of biosystematics, environmental impacts, ecological studies in protected areas, etc.

It of course needs far more efforts to prepare a broad base of taxonomists, biosystematists and use of sophisticated instrumentations like Computers in its programmes. The next few years need to be devoted to these.

The Headquarters with its various laboratories in Howrah and Calcutta and regional stations, are already involved in programmes of great national relevance and are always ready for further meaningful involvement in the tasks of national and international importance. Its programmes for remaining part of the Sixth FYP and the Seventh FYP* are to be geared to meet these objectives.

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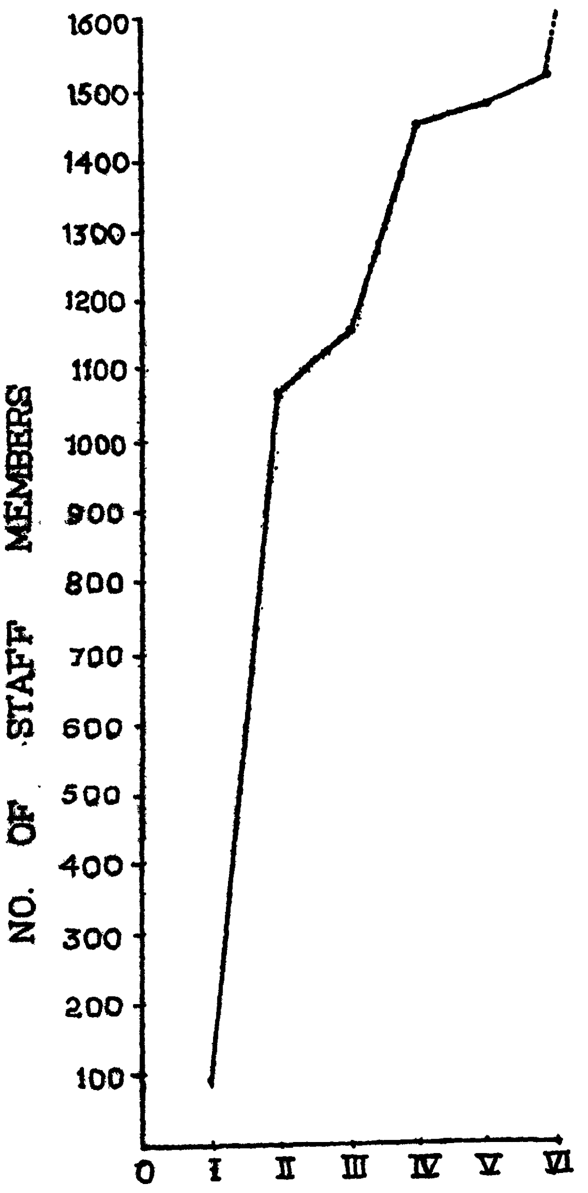
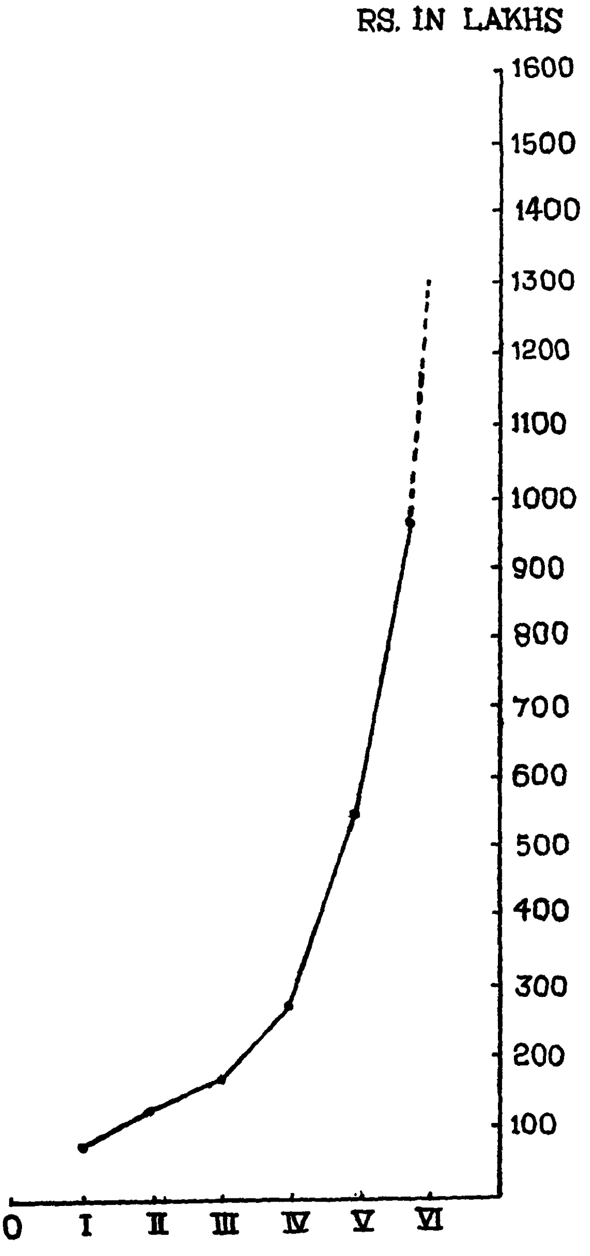
* A brief outline of the draft VII FYP is given in Appendix.





(----PROPOSED IN 84-85)

Fig. 1

Fig. 2

APPENDIX

Review of VI Plan, and draft of significant Programmes in VII Plan

INTRODUCTION

The Botanical Survey of India has been engaged in the survey of plant resources and collection of base line data for conservation, utilization and fuller knowledge of various ecosystems in India. Now approaches like ecology, biosystematics, and ethnobotany have been introduced into the programmes of the Survey. The Department is providing necessary data and scientific support to important national programmes like biosphere reserves, preservation of habitats, conservation of threatened species, environmental impact assessment CITES, MAB, etc.

The publication of new Flora of India, State Flora Analysis and micro-level District floras has been started. Great awareness about role of plants in environment has been created. It is, however, realized that much more needs to be done in all these areas.

REVIEW OF PROGRESS IN VI PLAN

I. *Pollution control* :
Studies were undertaken in Sal forest areas around Durgapur Steel Plant complex, and industrial areas of Rishra — Howrah Complex. Reports drafted on former.

II. *Environmental Assessment* :
Work was taken up in several areas such as Silent valley, Dudhwa national Park, Tehri Garhwal area, Great Nicobar, Idukki Project area and Bastar District in M.P. work on Dudhwa has been completed, Idukki is nearing completion. Others are in progress.

III. *Living Natural Resources Conservation* :

Inventorisation was intensified, and critical work for flora of India speeded up. 13 fascicles of flora of India have been published. State flora analysis of two states, viz. Tamil Nadu and Himachal Pradesh are in press. Manuscripts for Rajasthan, Maharashtra and Madhya Pradesh are in progress. One district flora and one regional flora were published during the VI Plan, 3 districts floras are in Press. A new programme on district floras has been lauched and about 40 districts allotted to botanists in educational institutions. One new regional station was started in Sikkim Himalayas.

Conservation units were initiated in botanical gardens. First Directory of Botanic Gardens, Catalogue of Threatened Plants and Threatened Plants in cultivation in Botanic Gardens of BSI were published/prepared.

Assessment of threatened plants is being continued, and literature on the subject generated regularly. Some scientists were given preliminary training in Remote sensing, vegetation mapping and computer systems. Studies have been initiated on flora and ecology of protected areas like National Parks, Game sanctuaries and prospective Biosphere Reserve areas.

Studies have been completed for Kaziranga, Dudhwa and Manas; work is in progress in Silent Valley, Namdapha, Nanda Devi, Andaman Island, etc.

Support was provided to the functioning of CITES in India and data was fed for the appendix and proformas, etc.

The National Plant Conservation Action Plan was drafted in collaboration with the IUCN team. The draft has been circulated for comments.

Proposals for the new Botanic Gardens and support to existing gardens are under study.

IV. *Eco-development* :
The BSI has been involved in formulation and scrutiny of eco-development projects. It provided technical support to many NGOs like Friends of Trees, WWF, etc. in their field work.

The Ethnobotanical researches of the BSI also have close relationship with conservation education and eco-development.

V. *Research Promotion* :
The BSI provided research fellowships and even a position of Emeritus Scientist to non BSI institutions and individuals.

The BSI has completed two MAB projects (Great Nicobar and Dudhwa) and at present has two more projects in Bastar and Namdapha. It also has a project at Idukki.

VI. *Environmental training, education and awareness* :
The BSI sent scientists to UK and USA for training in taxonomy, threatened plants and conservation work.

4 Seminars and symposia were held on Threatened Plant resources and conservation.

Some scientists attended short courses in Remote sensing, vegetation mapping, etc.

Work on environmental awareness and education is done mainly in the Industrial Section of the Indian Museum (ISIM).

During VI Plan, audiovisual equipment has been provided and presentations organised in schools and colleges and also in functions of NGOs.

The Indian Botanic Garden catered to tourists and provided printed materials and information of environmental significance.

VII. *Society Environment Interactions* :
A detailed study was made of the plant *Coptis teeta* in Arunachal Pradesh which helped in economic advancement of local people.

Studies were undertaken among the tribal and rural people living in or near protected areas such as in Dudhwa, Silent valley, Idukki etc.

VIII. *Coordination with State Governments* :
The BSI provides technical support to several state Boards for Wild life or Environmental Committees. The regional stations of BSI are mostly associated with these bodies and assist in policy formulation, etc.

IX. *Environmental information* :
The BSI provided data to ENVIS, HQ for inventory of Ecologists. Data was collected during VI Plan on Type Species and Threatened Plants. It will be fed into computer in DOEn.

X. *International Cooperation* :
During the VI Plan

(1) the BSI participated in several International Seminars.

(2) the BSI actively associated with the IUCN team in August 1983 to develop the draft of the National Plant Conservation Action Plan.

POLICY FRAMEWORK

The policy during the VII Plan will be to fill gaps in our knowledge of plant resources of the country and take steps to conserve them and to further educate the people about role of plants in our life and environment through use of modern instrumentation, where applicable.

THRUST AREAS

It is proposed to have the following thrust areas during the VII Plan.

(a) Studies on ecology and flora of protected areas and mapping of flora and vegetation through modern methods like aerial photography, etc.

(b) Speed up the inventory of plant resources and series of Flora of India.

(c) Sophistication of taxonomic studies through modern approaches like cytotaxonomy, palynology, anatomy and ethnobotany. Preparation of chromosome atlas, Pollen atlas, etc.

(d) Involve closely in various components of the National Plant Conservation Action Plan, through promotion and establishment of protected areas and botanic gardens and assessment of pollution tolerant plants.

(e) Introduce computerisation and better instrumentation in all programmes.

(f) Adequate measures for manpower development to meet the above needs.

(g) Provide strong infrastructure of physical facilities like buildings for herbaria, musea, laboratories and residences of staff and administrative support for proper organization and functioning.

PLAN PROGRAMMES

4.1 *Thrust areas* :

4.1.1 Comprehensive biological survey for inventory and ecological aspects will be done of unexplored areas, particularly in biosphere reserves and other protected areas, such as Arunachal*, Andaman and Nicobar, Westernghats* Kashmir, Garhwal Himalayas, semiarid regions and marine areas. Several aspects will be studied jointly with the ZSI. Priority areas* will be completed during VII Plan.

Monographic work for Flora of India will be done for economic families, and about 50 families/tribes completed during VII Plan.

4.1.2 Unexploited plant resources will be studied and a mopping survey of ethnobotanically significant areas completed during VII Plan.

4.1.3 Biosystematic work will be intensified in HQ and selected regional stations like Coimbatore, Pune, Dehradun, Shillong and Port Blair.

4.1.4 Pollution tolerant species will be studied ; industrial belts around Calcutta, Pune and Madras will be taken up.

4.1.5 Methodologies will be developed for Environment Impact Assessment. Environment Monitoring units, which are expected to start this year will be expanded. Sites of development projects and mining areas will be studied.

The feeding habits of some animals will be studied in National Parks, in collaboration with Wildlife Division.

4.2 *Intensification of ongoing programmes*:

4.2.1 The Headquarters and regional stations including gardens will be strengthened with scientific and supporting staff to undertake Thrust areas and other programmes. The biosystematic and cryptogamic units will be enlarged.

4.2.2 Studies on threatened plants will be intensified and populations of economic species monitored (eg. in *Podophyllum, Saussurea, Commiphora, Nardostachys,* Orchids).

4.2.3 Efforts will be made for conservation of species *in situ* or in gardens, and through multiplication by tissue culture, seed biology etc.

4.2.4 Facilities for creating environmental awareness will be increased in Museum and established in other offices. Interaction with educational institutions, will be intensified, and district flora scheme carried to more centres.

4.3 *New Programmes* :

4.3.1 For exhaustive exploration, monitoring and impact assessment in different biogeographic regions, some new stations will be set up in high altitudes, semiarid areas, coastal regions, palm garden, etc.

4.3.2 Biology will be studied of selected rare species, like in *Dischidea, Hydnophytum, Nepenthes,* orchids. Selected type localities (like of *Frerea, Ceropegia*) will be studied, and if necessary restored.

4.3.3 For streamlining and expediting the work, sophisticated technology, instrumentation and computerisation will be adopted. Effort will be made to provide SEM at 2-3 regional offices.

4.3.4 Special emphasis will be given to manpower development and proper employment generation. Training facilities will be created in HQ and selected regional stations.

In brief, the BSI will consolidate, intensify and streamline its facilities and expertise to undertake increased work on Flora of India and several aspects of the National Plant Conservation Action Plan.

Major Publications of the Botanical Survey of India :

(A) Bulletin of the Botanical Survey of India — First issue released in 1959.

(B) Records of the Botanical Survey of India —the following titles have been published dealing with monographic works relating to Plant Taxonomy or other related subjects :

VOL. 1

Report on a Botanical Tour in Kashmir by J. F. Duthie No. 1 : 1-18, 1893.

Report on a Botanical Tour in Sikkim by G. A. Gammie No. 2 : 19-24, 1894.

Report on a Botanical Tour in Kashmir by J. F. Duthie No. 3 : 25-47. 1894.

Notes on a Journey from Haveri to Kumta by G. Marshall Woodrow No. 4 : 49-57. 1894.

Notes of a Botanical Tour in Travancore, etc. by M. A. Lawson No. 4 : 58-60. 1894.

Report on a Botanical Tour in Lakhimpur

District, Assam by G. A. Gammie No. 5 : 61-88. 1895.

Botanical Notes on a Journey from Poona to Nagotne by G. Marshall Woodrow No. 6 : 89-97. 1896.

A note on Indian wheat Rusts by D. D. Cuningham & D. Prain No. 7 : 99-124. 1896.

A note on the botany of the Baluch-Afghan Boundary Commission by F. P. Maynard & D. Prain No. 8 : 125-137. 1896.

The Botany of the Chitral Relief Expedition G. A. Gammie No. 9 : 139-181. 1898.

A botanical Tour in Chamba and Kangra by G. A. Gammie No. 10 : 183-214. 1898.

A note on the botany of the Kachin hills North-east of Myitkyina by E. Pottinger & D. Prain No. 11 : 215-320. 1898.

Contribution to the Bryological flora of Southern India : Report on a collection of Mosses made by Dr. T. C. Walker in Coorg during the cold weather of 1897-98 by V. F. Brotherus No. 12 : 321-329. 1899.

A botanical tour in the South Lushai Hills by A. T. Gage No. 12 : 331-369. 1899.

VOL. 2

Plants of Chotanagpur, Jaspur & Sirguja by J. J. Wood 1-170. 1903.

A note on the plants used during famines and seasons of scarcity in Bombay Presidency by G. A. Gammie 171-196. 1903.

Systematic enumeration of the species of *Calamus* and *Daemonorops* with diagonosis of the new ones by O. Beccari 197-230. 1903.

Flora of the Sundribans by D. Prain 231-370. 1903.

A Census of the Indian Polygonums by A. T. Gage 371-452. 1903.

VOL. 3

The vegetation of the District of Minbu in Upper Burma by A. T. Gage No. 1 : 1-141. 1904.

The vegetation of the districts of Hugli, Howrah and the 24-Parganahs by D. Prain No. 2 : 143-339. 1905.

Sapindaceae Novae indicae at Malaicae ex herbario Calcuttensi by L. Radlkofer No. 3 : 341-376. 1907.

VOL. 4

An epitome of the British Indian species of *Impatiens* by J. D. Hooker No. 1 : 1-10. 1913.

An epitome of the British Indian species of *Impatiens* by J. D. Hooker Part II, No. 2 : 37-57. 1913.

An epitome of the British Indian species of *Impatiens* by J. D. Hooker Part III, No. 3 : 37-57. 1913.

Notes from a journey to Nepal by I. H. Burkill No. 4 : 59-140. 1910.

The vegetation of the Zemu & Llonakh valleys of Sikkim by W. W. Smith & G. H. Cave No. 5: 141-260. 1911.

Some additions to the flora of the Eastern Himalayas by W. W. Smith No. 5 : 261-272. 1911.

Some additions to the flora of Burma by W. W. Smith No. 5 : 273-282. 1911.

Four new species of the Compositae from South India and a *Justicia* from Assam by W. W. Smith No. 5 : 283-385. 1911.

Determinations of the prickly Pears now wild in India by I. H. Burkill No. 6 : 287-322. 1911.

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